

Hypoxia in Hood Canal: status and contributing factors

Jan Newton, University of Washington, Applied Physics Lab*

Dan Hannafious, Hood Canal Salmon Enhancement Group

Julia Bos, Washington State Dept of Ecology

Mark Warner, University of Washington, School of Oceanography

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Hood Canal, a fjord-like sub-basin of Puget Sound, Washington State, USA, is a long, deep, narrow, productive estuary with strong seawater density stratification. These are all conditions conducive to its slow circulation and seasonally low oxygen concentrations, based on observations dating back to the 1950's. However, in recent years, especially since the mid-1990's, the frequency, duration, and spatial extent of the hypoxia has increased. Major biota kills occurred in both 2002 and 2003, though kills have been reported historically as well. Of concern, the inventory of dissolved oxygen in the deep waters of the southern portion of the canal, where the hypoxia is strongest, measured during the 2000's are among the lowest, and 2004 is currently the lowest, on record compared to data from the 1950's, 60's, and 90's. We present an update and analysis of the oxygen and other hydrographic data to date. Causes for this severe and seemingly deteriorating condition could be many and potentially include human-mediated loading of nitrogen or organics, changes in river flow delivery that could affect circulation, changes in oceanic water properties, and local weather forcing. We present the evidence for some of these contributing factors. A modeling study will address the quantitative balance of these factors in driving the observed hypoxia.